

# EXHIBIT 1

**MICHAEL LEBBY, PH.D.**



**EDUCATION:**

2004, Doctor of Engineering  
University of Bradford, United Kingdom  
Citation, *"Technical Contributions to Optoelectronics"*

1987, Ph.D.  
University of Bradford, United Kingdom  
Thesis, *"Characterization and Fabrication of the HFET and BICFET"*

1985, MBA  
University of Bradford, United Kingdom  
Thesis, *"Small Business Planning for a Start-up"*

1984, Bachelors (B. Eng – Honors)  
University of Bradford, United Kingdom  
Thesis, *"Computer Aided Testing of Semiconductor Devices"*

**WORK HISTORY:**

2014 –Present

**University of Southern California**

*Director CFR (Corporate & Foundation Relations)*

Lebbly assisted USC Viterbi Engineering to foster tighter faculty-industry relationships in high technology, IT, social media, graphic arts, electronics, photonics and communications segments. USC historically has strengths in Oil, Gas, and Defense industries in LA region, but not with IT/semiconductors/electronics/photonics in the Bay Area (San Francisco). Lebbly created new opportunities for USC in the Bay Area using his technical skills to add a strong and deep technical knowledge to proposals. Lebbly focused on advanced robotics proposal, bio/medical-photonics, photonics, cloud computing, and electronics initiatives.

- 2013 – Present      **European Commission, Technical Expert**  
 In 2013 Lebbby became a technical expert for the Photonics Unit of the European Commission. Lebbby has participated in organizing workshops, lectures, evaluating photonics proposals, and advising the Commission on funded projects. Lebbby currently is an advisor on 3 photonics pilot lines (MIRPHAB, PI-SCALE, PIX4LIFE) and a photonics based cardiovascular disease program (CARDIS).
- 2013 – Present      **OneChip Photonics Corporation**  
*President and CEO*  
 Elected independent board member focusing on technical and business operational strategy for communications based InP Photonic Integrated Circuit (PIC) and optoelectronic Integrated Circuit (OEIC) platforms for Onechip Photonics in 2008. Lebbby was then asked to restructure Onechip Photonics Corporation in June 2013. Lebbby's current focus is on the attraction of new investment into Onechip Photonics and refocusing the company towards two major applications: (1) client-side network datacenter optical engines for ultra-small, ultra-low power 100-400Gbps transceivers, and (2) line-side network coherent optical engines for high performance communications
- 2013 – Present      **Glyndwr University**  
*Professor of Optoelectronics*  
 In 2013 Lebbby became full Professor of Optoelectronics (part-time) to assist Glyndwr University to position itself as a leader in optoelectronics and photonics. Areas of focus include design, simulation, and testing of 100G/400G photonic integrated circuits (PICs) and optoelectronics integrated circuits (OEICs).
- 2003 – Present      **Oculi, LLC**  
*President and Owner*  
 Oculi provides an international Board level advisory, consulting, technological, and business based services in the optoelectronics, semiconductor, and telecommunications industries. Oculi also provides consulting in expert witness, trial, deposition, expert reports, infringement, invalidity, and various patent and IP litigation in optoelectronics, semiconductors, and fiber optic telecommunication technology segments.
- 2010 – 2013      **Translucent, Inc.**  
*GM and CTO*  
 Lebbby positioned Translucent on the product development and manufacture of epitaxial semiconductor wafers. Lebbby led the R&D and development of MBE based rare earth oxide single crystal epitaxial layers deposited onto large silicon wafers. On top of these wafers both MBE and MOCVD Gallium Nitride epitaxial

device layers were grown for devices. The use of GaN-on-Si is expected to be a strong catalyst for change in the power electronics and LED lighting industries. In a parallel program at Translucent, Lebby led the development efforts to develop and productize Germanium-Tin (GeSn) template wafers onto large format silicon wafers (Ge-on-Si) to enable cost effective, and ultra-high efficiency CPV multi-junction solar cells for the CPV industry. Furthermore, the challenge of successfully preparing III-V on silicon templates via GeSn has huge upside in the electronics and silicon photonics industry.

Lebby brought together a world class technology team, and has established international relationships with customers, collaborators, researchers in Asia, Europe, and North America. Lebby has also positioned Translucent as a world-class epitaxial company that is poised with advanced technological platforms that have the potential for high impact in the target markets (power electronics, LED lighting, CPV solar, and III-V on silicon high speed electronics).

2005 – 2010

**OIDA(Optoelectronic Industry Development Association)**

*President and CEO (Board Member)*

OIDA (non-profit industry trade association for optoelectronics/photonics) was acquired by OSA early 2010. Lebby represented the optoelectronics industry and organized technical conferences/workshops/forecasts with industry roadmaps. Initiated green photonics metrics.

Lebby positioned OIDA as a National resource in the field of optoelectronics, and has represented industry in many capacities ranging from talks, papers, expert witness, testimony, market and technical reports. Lebby created new industry based initiatives in fiber optics broadband as well as the green photonics movement that is now occurring globally.

Under Lebby's leadership, OIDA's membership increased to include many major manufacturers of optoelectronics components, modules and systems. In his last year as CEO, Lebby worked with the FCC to drive higher Internet speeds for consumers with the use of fiber optics. Lebby positioned OIDA to assist the optoelectronics industry in their recovery, and also to help both US State and Federal governments in their drive to increase skilled optoelectronic jobs, R&D, and manufacturing. The annual OIDA market technology report has become one of the most extensive reviews available for OIDA members that forecasts optoelectronics technologies for the next decade.

Lebby's activities at OIDA have raised the profile of 'green photonics' from both a technology and a marketing standpoint. After reviewing the photonics technology forecasts over the next decade, it became clear to OIDA in 2006 that green photonics would be poised to for significant growth globally. With a green photonics workshop (Sept 2008), and a full peer-reviewed technical conference with over 100 papers (May 2009), and a new conference (June 2010) Lebby helped the segment to become better defined. Lebby has stated in public conferences and meetings with numerous plenary and keynote talks that photonics will quickly grow to be a strong enabler for energy efficient systems in the future.

2003 - 2005

**OCLARO**

*VP Technology and BD*

Telecommunication optoelectronic components, San Jose, Ca. Focus on technology strategy for components and sub-systems. Lebbly fully integrated Ignis Optics Inc into the central Bookham operations, sales, and development systems. Lebbly conducted due diligence and fiscal/technical analysis on a number of strategic targets for acquisition and merger. Lebbly generated an outsourced fabrication strategy with streamlined product lines for Bookham's drive to be a one-stop-shop in the fibre-optic telecommunications component and sub-system business.

2001 - 2003

**Ignis Optics**

*President and CEO (Founder/Board Member)*

Venture-backed start-up, San Jose, California manufacturing 10Gbps fiber optic transceivers. In 2001, Lebbly founded a new fiber optics company, Ignis Optics, where he served as the CEO. Lebbly led the company to secure a multinational customer base through its development of 10Gbps transceiver products. Ignis Optics was acquired by Bookham Technology (now Oclaro) in October 2003 and Lebbly became responsible for corporate and technical strategy at Bookham Technology until 2005. Key investors for Ignis Optics were Morgenthaler, Interwest, Storm Ventures, Centerpoint.

1999 – 2001

**Intel Capital**

*Director Business Development/Investor (w/Board observer position on Investment)*

Intel Capital, Santa Clara, California. In 1999, Lebbly joined Intel as a corporate investor and was responsible for sourcing, negotiating, and closing private placement equity deals in the optical networking, component, and semiconductor arenas. Lebbly served as Intel's board observer on a number of photonics based start-ups. Lebbly was one of the co-founders of Intel's photonics division in the year 2000.

1998 – 1999

**TE Connectivity**

*Director Technology/BD (Fiber Optics)*

Global Optoelectronics Division: Technology strategy for optical communications products. In August 1998, Lebbly joined Tyco Electronics (previously AMP) as a member of the Global Optoelectronics Division's management team, where he was responsible for growing the fiber optic datacom and telecom business through external interactions that include mergers, acquisitions strategic alliances, and technical strategic planning. Lebbly worked closely with the Lytel (NJ) fiber optics team to develop next generation fiber optic transceiver and component products.

Key achievements:

\* Planned and presented to executive management a technical strategy to grow fiber optics through acquisition and partnership.

- \* Negotiated (and narrowly missed) the acquisition of a public company with a revenue stream of \$100M's that specializes in optoelectronics technology. Organized the due diligence process.
- \* Completed a technology transfer contract with a major optoelectronics technology public company.
- \* Negotiated technical vendor agreements that involve optoelectronic component technology.
- \* Influenced the optoelectronics/fiber optics management team to change strategy by pairing down obsolete and non-profitable products, and then re-focusing to allow the generation of new and more competitive products via core competence and gap analysis.
- \* Influenced the direction of the R&D division through technical peer review and internal presentations on new technology and areas of increased margins.
- \* Influenced the R&D and operating divisions (Lytel, NJ; Fibernet, Australia and Passive Products, Ca) by generating internal technology and product roadmaps for a renewed vision of growth.

1989 – 1998

### **Motorola**

#### *R&D Manager*

Corporate R&D Labs, Tempe, Arizona. Optoelectronics: VCSEL based product solutions (OPTOBUS); materials, devices, packaging, systems. In 1989 Lebby joined Motorola's Phoenix Corporate Research Laboratory in Phoenix, Arizona. Lebby researched and developed III-V compound semiconductor devices and focused his work in bringing the VCSEL technology to full scale manufacturing. Lebby co-founded a market changing datacom product called Optobus™ as an intrapreneur at Motorola. Lebby was also the lead inventor in Motorola's history with over 150 issued utility patents.

#### Key achievements:

- \* Motorola rank #1 (at that time) for issued USPTO patents with >150
- \* Negotiated with both corporate R&D and Motorola SBUs to support VCSEL & OPTOBUS based technology product development and research while Motorola built infrastructure for development and commercial manufacturing.
- \* Managed R&D technical programs that were essentially VCSEL device, growth and packaging based product development that supported an aggressive business plan.
- \* Led the initiative in R&D to drive the standard Motorola qualification (XC, MC) process for a new technology.
- \* Led technologists to invent and patent key material, device, package, and system solutions. Motorola eventually sold parts of the patent portfolio on the commercial market.
- \* Managed R&D contracts (internal & external) to gain leverage for the R&D programs. One example is the ~\$20M NIST ATP program called TRAAMS, to develop VCSELS for mass optical data storage. Participants included Polaroid, Xerox, SAIC, with start-ups and Universities to design innovative technology.
- \* Standard finance control and budget planning with annual budgetary run-rates up to \$10M.
- \* Was a customer interface with numerous on-site presentations. Lebby became the de

facto chief technologist for a major alliance with an International Fiber Optics company (who wanted Motorola's VCSELs for Datacom transceivers).

1985 – 1989

**AT&T**

*Researcher*

AT&T Bell Labs - Photonics Research Dept (Dept 11366), Holmdel, NJ. Lebbby designed and fabricated new GaAs and InP optoelectronic devices that were grown both by MOCVD and MBE. Research centered on a III-V compound semiconductor inversion channel effect that allowed both electronic (HFETs, Bipolar transistors) and photonic (photodetectors, lasers, LEDs) to be fabricated using common mask sets and process fabrication sequences.

Key achievements:

- \* Supervised up to 10 PhD students on InP and GaAs related optoelectronics and electronic device projects.
- \* Demonstrated world-class electronic FET, bipolar, photodetector, and laser results.
- \* Learned how to maintain, run, and upgrade vacuum clean room equipment.

1977 – 1984

**UK Ministry of Defense**

*Apprenticeship/Journeyman + Electronics Engineer (REME and RSRE)*

Lebbby started his career at the Royal Electrical and Mechanical Engineer (REME) division of the Ministry of Defence in the UK. Lebbby was a telecommunications apprentice, and repaired all types of radio/RF communications equipment. Lebbby moved to the Royal Signal and Radar Establishment (RSRE) to study material and characterization issues of GaAs and InP devices.

**EXPERT WITNESS EXPERIENCE:**

1. Active case work: 1Q2009 (March 24<sup>th</sup> 2009); *Testimony: **US-China Economic and security review commission on the optoelectronics industry. US Congress, Capitol Hill;*** Written statement on the status of the USA optoelectronics industry with aural cross-examination by the commission.
2. Active case work: 3Q2010-1Q2011; ***Finisar Corp. v. Optical Communication Products Inc*** No. 10-cv-05617 and No. 11-cv-00104 (retained by plaintiff - Morgan, Lewis & Bockius LLP).
3. Active case work: 1Q2011; ***Ziptronix, Inc. v. OmniVision Technologies, Inc., Taiwan Semiconductor Manufacturing Company Ltd., and TSMC North America Corp.,*** No. 11-CV-5235 (retained by plaintiff – Alston Bird LLP).
4. Active case work: 3Q2011 to 3Q2012; ***Certain Light-Emitting Diodes and Products Containing Same, Inv. No. 337-TA-798*** (USITC filed July 15, 2011) (retained by respondent Samsung – Covington & Burling LLP).
5. Active case work: 3Q2011 to 2Q2015; ***Cheetah Omni, LLC v. Alcatel-Lucent USA Inc.,*** No. 11-CV-390 (E.D. Tex. filed July 29, 2011) (retained by plaintiff – Brooks Kushman).

6. Active case work: 4Q2012 to 3Q2014; **Finisar Corp. v. Cheetah Omni, LLC**, No. 11-CV-15625 (E.D. Mich. filed Dec. 23, 2011) (retained by defendant – Brooks Kushman).
7. Active case work: 4Q2012 to 3Q2013; **Certain Optoelectronic Devices for Fiber Optic Communications, Components Thereof, and Prods. Containing the Same**, Inv. No. 337-TA-860 (USITC filed Sept. 24, 2012) (retained by respondent – Alston & Bird LLP).
8. Active case work: 3Q2014 to 2Q2015; **Microscan Sys., Inc. v. Cognex Corp.**, No. 14-CV-6952 (S.D.N.Y. filed Aug. 27, 2014) (retained by plaintiff – Morrison & Foster LLP).
9. Active case work: 2Q2014 to 1Q2016; **Avago Techs. Fiber IP (Singapore) PTE Ltd. v. IPtronics Inc.**, No. 10-CV-2863 (N.D. Cal. filed June 29, 2010) (retained by respondent – Alston & Bird LLP).
10. Active case work: 1Q2015 to 3Q2015; **Regarding certain optical disc drives**, Inv. No. 337-TA-897 (USITC filed Oct. 21, 2013) (retained by respondent – O’Melveny & Myers LLP).
11. Active case work: 1Q2015 to 2Q2015; **BMW of N. Am., LLC v. Innovative Display Techs., LLC**, Nos. IPR2015-00933, IPR2015-00934 (P.T.A.B. filed Mar. 24, 2015) (retained by defendant – Crowell Moring LLP).
12. Active case work: 1Q2015 to 3Q2016; **OneChip Photonics Inc.**, Pre-litigation IP Case No. TBD; (retained by plaintiff – Patent Monetization Inc. (PMI)).
13. Active case work: 2Q2016; **IDT v. Hyundai Motor Co.**, No. 14-CV-201 (E.D. Tex. filed May 4, 2015) (retained by defendant – DLA Piper LLP).
14. Active case work: 1Q2015 to 3Q2015; **Cree Inc., v. Honeywell Int’l Inc., No. 3:14-CV-737** (W.D. Wisc. filed Oct. 28, 2014) (retained by defendant - Arnold & Porter LLP).
15. Active case work: 2Q2015 to 4Q2015; **Trs. of Boston Univ. v. Everlight Elecs. Co.**, Nos. 12-CV-11935, 12-CV-12326, 12-CV-12330 (D. Mass. filed Oct. 17, 2012) (retained by plaintiff - Shore Chan DePumpo LLP).
16. Active case work: 3Q2015 to 3Q2016; **LG Elecs. Inc. v. Toshiba Samsung Storage Tech. Corp.**, No. 12-CV-1063 (D. Del. filed Aug. 22, 2012) (retained by plaintiff – DLA Piper & Nixon Law).
17. Active case work: 3Q2015; **Heptagon Pre-litigation** IPR petition; (retained by plaintiff – Proskauer Rose LLP).
18. Active case work: 1Q2016 to 3Q2016; **Dentsply v. Am. Orthodontics Inc.**, No. 15-CV-1706 (D. Pa. filed Sept. 1, 2015) (retained by defendant – Godfrey Kahn LLP).
19. Active case work: 2Q2016 to Present; **Koninklijke Philips N.V. v. Elect-tech Int’l (H.K.)**, No. 14-CV-2737 (N.D. Cal. filed Aug. 12, 2015) (retained by plaintiff – Reed Smith LLP).
20. Active case work: 2Q16 to 4Q16; **Bluestone Innovations Ilc. v. E. Mishan & Co. Inc.**, Pre-litigation IP Case No. TBD; (retained by defendant - Notaro, Michalos, & Zaccaria P.C.).
21. Active case work: 3Q16-1Q17; **511 Innovations Inc. v. HTC Am., Inc.**, No. 15-CV-1524 (E.D. Tex. Filed June 30, 2016) (retained by plaintiff – The Davis Firm).
22. Active case work: 3Q16-4Q16; **MellanoX Techs. Ltd. v. Methode Elecs. Inc.**, No. 15-CV-3730 (N.D. Cal. filed Aug. 16, 2015) (retained by plaintiff – Alston & Bird).



23. Active case work: 4Q16-Present; **Novanta Inc., v Iridion Inc.**, No. 15-CV-01033 (D. Del. filed Nov. 9, 2015) (retained by defendant – Barnes and Thornburg LLP).
24. Active case work: 1Q17-Present; **Optolum Inc., v Cree Inc.**, No. 16-CV-03828; (D. Az. filed Nov. 3, 2016) (retained by defendant – Jones Day).
25. Active case work: 1Q17-Present; **Polygroup Macau Ltd (BVI), v Willis Electric Co., Ltd.**, (15-CV-00552 W.D. N.C. Filed: Apr 21<sup>st</sup> 2016), (retained by plaintiff - Troutman Sanders LLP).
26. Active case work: 1Q17-Present; **Macom Technology Solutions Holdings Inc., and Nitronex, LLC., v Infineon Technologies AG and Infineon Technologies North American Corp.**, (16-CV-02859 C.D. Ca. filed Apr 26, 2016) (retained by plaintiff – Baker Botts LLP).

**PATENTS:**

6,999,644	Discrete optoelectric package
6,966,703	Self eject latch mechanism for an optical transceiver module
6,795,461	Optoelectric module
6,663,296	Optoelectric module
6,243,056	Transceiver with miniature virtual image display
6,228,440	Perishable media information storage mechanism and method of fabrication
6,161,106	Perishable media system and method of operation
6,158,884	Integrated communicative watch
6,156,582	Method of fabricating top emitting ridge VCSEL with self- aligned contact and sidewall reflector
6,131,017	Dual system portable electronic communicator
6,122,023	Non-speckle liquid crystal projection display
6,121,068	Long wavelength light emitting vertical cavity surface emitting laser and method of fabrication
6,115,618	Portable electronic device with removable display
6,111,839	Optical pickup head including a coherent first order mode laser light source
6,097,748	Vertical cavity surface emitting laser semiconductor chip with integrated drivers and photodetectors and method of fabrication
6,097,528	Microscanner for portable laser diode displays
6,096,666	Holographic textile fiber
6,091,754	VCSEL having integrated photodetector for automatic power control
6,084,697	Integrated electro-optical package

6,080,690	Textile fabric with integrated sensing device and clothing fabricated thereof
6,069,593	Display carrier and electronic display control for multiple displays in a portable electronic device
6,064,780	Interconnect substrate with a single contact accessible in an upper and an end surface
6,061,485	Method for wavelength division multiplexing utilizing donut mode vertical cavity surface emitting lasers
6,061,380	Vertical cavity surface emitting laser with doped active region and method of fabrication
6,029,073	Display carrier with binocular viewing for a portable electronic device
6,026,111	Vertical cavity surface emitting laser device having an extended cavity
6,022,760	Integrated electro-optical package and method of fabrication
6,021,147	Vertical cavity surface emitting laser for high power single mode operation and method of fabrication
6,021,146	Vertical cavity surface emitting laser for high power single mode operation and method of fabrication
6,008,067	Fabrication of visible wavelength vertical cavity surface emitting laser
5,978,398	Long wavelength vertical cavity surface emitting laser
5,974,071	VCSEL with integrated photodetectors for automatic power control and signal detection in data storage
5,966,399	Vertical cavity surface emitting laser with integrated diffractive lens and method of fabrication
5,959,315	Semiconductor to optical link
5,956,364	Vertical cavity surface emitting laser with shaped cavity mirror and method of fabrication
5,956,363	Long wavelength vertical cavity surface emitting laser with oxidation layers and method of fabrication
5,953,355	Semiconductor laser package with power monitoring system
5,946,121	IrDA data link with VCSEL light source
5,943,359	Long wavelength VCSEL
5,943,357	Long wavelength vertical cavity surface emitting laser with photodetector for automatic power control and method of fabrication
5,939,773	Semiconductor laser package including a lead frame and plastic resin housing
5,936,929	Optical submodule and method for making

5,923,696	Visible light emitting vertical cavity surface emitting laser with gallium phosphide contact layer and method of fabrication
5,914,973	Vertical cavity surface emitting laser for high power operation and method of fabrication
5,906,004	Textile fabric with integrated electrically conductive fibers and clothing fabricated thereof
5,905,750	Semiconductor laser package and method of fabrication
5,903,586	Long wavelength vertical cavity surface emitting laser
5,898,722	Dual wavelength monolithically integrated vertical cavity surface emitting lasers and method of fabrication
5,886,972	Recording information in a phase change optical medium with a vertical cavity surface emitting laser
5,883,912	Long wavelength VCSEL
5,881,084	Semiconductor laser for package with power monitoring system
5,848,086	Electrically confined VCSEL
5,838,707	Ultraviolet/visible light emitting vertical cavity surface emitting laser and method of fabrication
5,838,703	Semiconductor laser package with power monitoring system and optical element
5,835,521	Long wavelength light emitting vertical cavity surface emitting laser and method of fabrication
5,831,960	Integrated vertical cavity surface emitting laser pair for high density data storage and method of fabrication
5,821,571	Dual sided integrated electro-optical package
5,818,404	Integrated electro-optical package
5,815,524	VCSEL including GaTIP active region
5,796,769	Red light vertical cavity surface emitting laser
5,789,733	Smart card with contactless optical interface
5,774,486	Waveguide power monitoring system for vertical cavity surface emitting lasers
5,764,671	VCSEL with selective oxide transition regions
5,757,836	Vertical cavity surface emitting laser with laterally integrated photodetector
5,757,829	Flip chip power monitoring system for vertical cavity surface emitting lasers
5,757,741	CD ROM head with VCSEL or VCSEL array
5,751,757	VCSEL with integrated MSM photodetector
5,751,471	Switchable lens and method of making

5,748,665	Visible VCSEL with hybrid mirrors
5,748,161	Integrated electro-optical package with independent menu bar
5,742,630	VCSEL with integrated pin diode
5,741,724	Method of growing gallium nitride on a spinel substrate
5,739,800	Integrated electro-optical package with LED display chip and substrate with drivers and central opening
5,732,103	Long wavelength VCSEL
5,719,893	Passivated vertical cavity surface emitting laser
5,719,892	Hybrid mirror structure for a visible emitting VCSEL
5,710,441	Microcavity LED with photon recycling
5,708,280	Integrated electro-optical package and method of fabrication
5,706,306	VCSEL with distributed Bragg reflectors for visible light
5,703,664	Integrated electro-optic package for reflective spatial light modulators
5,699,073	Integrated electro-optical package with carrier ring and method of fabrication
5,661,075	Method of making a VCSEL with passivation
5,654,228	VCSEL having a self-aligned heat sink and method of making
5,644,369	Switchable lens/diffuser
5,638,392	Short wavelength VCSEL
5,636,298	Coalescing optical module and method for making
5,633,886	Short wavelength VCSEL with Al-free active region
5,625,734	Optoelectronic interconnect device and method of making
5,574,744	Optical coupler
5,563,900	Broad spectrum surface-emitting led
5,557,626	Patterned mirror VCSEL with adjustable selective etch region
5,555,341	Waveguide with an electrically conductive channel
5,550,941	Optoelectronic interface module
5,546,413	Integrated light emitting device
5,545,359	Method of making a plastic molded optoelectronic interface
5,543,958	Integrated electro-optic package for reflective spatial light modulators
5,540,799	Method of fabricating optical waveguide from a laminate
5,539,554	Integrated electro-optic package for reflective spatial light
5,539,200	Integrated optoelectronic substrate

5,538,919	Method of fabricating a semiconductor device with high heat conductivity
5,534,888	Electronic book
5,530,715	Vertical cavity surface emitting laser having continuous grading
5,521,992	Molded optical interconnect
5,517,348	Voltage controlled transparent layer for a bi-directional device
5,511,138	Interlocking waveguide and method of making
5,498,883	Superluminescent edge emitting device with apparent vertical light emission and method of making
5,493,437	External communication link for a credit card pager
5,491,491	Portable electronic equipment with binocular virtual display
5,486,946	Integrated electro-optic package for reflective spatial light modulators
5,485,318	Dual image manifestation apparatus with integrated electro-optical package
5,482,891	VCSEL with an integrated heat sink and method of making
5,482,658	Method of making an optoelectronic interface module
5,478,774	Method of fabricating patterned-mirror VCSELs using selective growth
5,473,716	Fiber bundle interconnect and method of making same
5,469,185	Remote sensory unit and driver
5,468,656	Method of making a VCSEL
5,468,582	Fused optical layer and method of making
5,467,215	Integrated electro-optic package for reflective spatial light modulators
5,466,633	Optical reading head and method for making same
5,452,387	Coaxial optoelectronic mount and method of making same
5,446,752	VCSEL with current blocking layer offset
5,437,092	Method of making contact areas on an optical waveguide
5,432,809	VCSEL with Al-free cavity region
5,432,630	Optical bus with optical transceiver modules and method of manufacture
5,428,704	Optoelectronic interface and method of making
5,422,901	Semiconductor device with high heat conductivity
5,416,870	Optoelectronic interface device and method with reflective surface
5,408,547	Optical read/write head
5,400,423	Molded star coupler and method of making same
5,400,352	Semiconductor laser and method therefor

5,390,275	Molded waveguide and method for making same
5,389,312	Method of fabricating molded optical waveguides
5,388,120	VCSEL with unstable resonator
5,369,529	Reflective optoelectronic interface device and method of making
5,369,415	Direct retinal scan display with planar imager
5,367,593	Optical/electrical connector and method of fabrication
5,361,317	Assembly with fixture aligning and affixing an optical fiber to an optical device
5,359,686	Interface for coupling optical fibers to electronic circuitry
5,359,669	Remote retinal scan identifier
5,359,618	High efficiency VCSEL and method of fabrication
5,358,880	Method of manufacturing closed cavity LED
5,351,331	Method and apparatus for splicing optical fibers with signal I/O
5,351,257	VCSEL with vertical offset operating region providing a lateral waveguide and current limiting and method of fabrication
5,349,210	Optical reading head with angled array
5,348,616	Method for patterning a mold
5,345,530	Molded waveguide and method for making same
5,345,527	Intelligent opto-bus with display
5,345,524	Optoelectronic transceiver sub-module and method for making
5,337,397	Optical coupling device and method for making
5,337,391	Optoelectronic sub-module and method of making same
5,335,300	Method of manufacturing I/O node in an optical channel waveguide and apparatus for utilizing
5,325,451	Modular optical waveguide and method for making
5,324,964	Superluminescent surface light emitting device
5,323,477	Contact array imager with integral waveguide and electronics
5,313,545	Molded waveguide with a unitary cladding region and method of making
5,309,537	Optoelectronic coupling device and method of making
5,286,982	High contrast ratio optical modulator
5,282,071	Contact areas on an optical waveguide and method of making
5,276,762	Magnetic holding methods for optical fiber I/O assembly
5,276,754	Optoelectronic mount and method for making

5,271,083	Molded optical waveguide with contacts utilizing leadframes and method of making same
5,265,184	Molded waveguide and method for making same
5,249,245	Optoelectroinc mount including flexible substrate and method for making same
5,230,030	Interface coupling electronic circuitry
5,228,101	Electrical to optical links using metalization
5,225,816	Electrical connector with display
5,218,465	Intelligent interconnects for broadband optical networking
5,172,384	Low threshold current laser
5,170,448	Optical waveguide apparatus and method for partially collecting light
5,125,054	Laminated polymer optical waveguide interface and method of making same
5,116,461	Method for fabricating an angled diffraction grating
5,068,007	Etching of materials in a noncorrosive environment
5,067,829	Dynamic optical beam steering
5,045,908	Vertically and laterally illuminated p-i-n photodiode
5,034,092	Plasma etching of semiconductor substrates
7,538,016	Signal and/or ground planes with double buried insulator layers and fabrication process
7,388,230	Selective colored light emitting diode
7,365,357	Strain inducing multi-layer cap
7,355,269	IC on non-semiconductor substrate
7,323,396	Signal and/or ground planes with double buried insulator layers and fabrication process
8,049,100	Multijunction rare earth solar cell
8,039,738	Active rare earth tandem solar cell
8,039,737	Passive rare earth tandem solar cell
7,968,384	Stacked transistors and process
7,967,653	Integrated Rare Earth Devices
7,821,066	Multilayered BOX in FDSOI MOSFETS

7,643,526	Spontaneous/stimulated light emitting mu cavity device
7,605,531	Full color display including LEDs with rare earth active areas and different radiative transistions
7,579,623	Stacked transistors and process
6,412,989	Directable laser transmission module
8,501,635	Modification of REO by subsequent III-N EPI process
8,455,756	High Efficiency solar cell using IIIB material transition layers
8,394,194	Single crystal reo buffer on amorphous SiO.sub.x
8,331,413	Integrated Rare Earth Devices
8,331,410	Spontaneous/stimulated light emitting mu.-cavity device

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2. Dargis, R.; Williams, D.; Smith, R.; Arkun, E.; Semans, S; Vosters, G.; **Lebby, M.**; and Clark, A., "Study of the Structural and Thermal Properties of Single Crystalline Epitaxial Rare-Earth-Metal Oxide Layers Grown on Si," (2011); ECS Transactions **doi: 10.1149/1.3633032**, ECS Trans. **2011** volume 41, issue 3, **161-167**  
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3. [Dargis, Rytis](#); [Arkun, E.](#) ; [Clark, Andrew](#) ; [Roucka, R.](#) ; [Smith, Robin](#) ; [Williams, David](#) ; **Lebby, Michael** ; [Demkov, Alexander A.](#) "Rare-earth-metal oxide buffer for epitaxial growth of single crystal GeSi and Ge on Si(111)," [Journal of Vacuum Science & Technology](#) [Volume:30 Issue:2](#)
4. Dargis. R, Clark. A, Arkun. F.E, Smith. R, **Lebby. M.**, "Engineering of the Interface between Silicon and Rare-Earth Oxide Buffer for GaN Growth," ECS Meeting, 27 October, 2013, San Francisco, USA. Doi: 10.1063/1.4753828
5. Roucka. R, Clark. A, Semans. S, Tolle. J, **Lebby. M.**, "Scalable virtual Ge templates for III-V integration on Si wafers," 8<sup>th</sup> International conference on concentrating photovoltaic systems: CPV8, 16-18<sup>th</sup> April 2012, Toledo, Spain.
6. [R. Dargis](#)<sup>a</sup>, [A. Clark](#)<sup>a</sup>, [E. Arkun](#)<sup>a</sup>, [R. Roucka](#)<sup>a</sup>, [R. Smith](#)<sup>a</sup>, [A.A. Demkov](#)<sup>b</sup>, **M. Lebby**<sup>a</sup>, "Growth and application of epitaxial heterostructures with polymorphous rare-earth oxides," [Journal of Crystal Growth](#), [Volume 378](#), 1 September 2013, Pages 177–179



7. Rytis Dargis<sup>\*</sup>, Erdem F. Arkun, Radek Roucka, Robin Smith, David Williams, Andrew Clark, **Michael Lebby**, "Epitaxial Si, SiGe and Ge on binary and ternary rare earth oxide buffers;" physica status solidi (c). Special Issue: E-MRS 2012 Spring Meeting – Symposium A, see further papers in Phys. Status Solidi A 209, No. 10 (2012). [Volume 9, Issue 10-11](#), pages 2031–2035, October 2012
8. [F. Erdem Arkun<sup>a</sup>](#), [Michael Lebby<sup>b</sup>](#), [Rytis Dargis<sup>b</sup>](#), [Radek Roucka<sup>b</sup>](#), [Robin S. Smith<sup>b</sup>](#) and [Andrew Clark<sup>b</sup>](#) "Scalable GaN-on-Silicon Using Rare Earth Oxide Buffer Layers," doi: 10.1149/05009.1065ecst *ECS Trans.* 2013 volume 50, issue 9, 1065-1071 [Electrochemical Society]
9. [R. Dargis<sup>z</sup>](#), [A. Clark](#), [E. Arkun](#), [R. Roucka](#), [D. Williams](#), [R. Smith](#) and [M. Lebby](#) "Epitaxial Si and Gd<sub>2</sub>O<sub>3</sub> Heterostructures: Distributed Bragg Reflectors with Stress Management Function for GaN on Si Light Emitting Devices,"; doi: 10.1149/2.004206jss *ECS J. Solid State Sci. Technol.* 2012 volume 1, issue 5, P246-P249
10. [R. Dargis<sup>z</sup>](#), [D. Williams](#), [R. Smith](#), [E. Arkun](#), [R. Roucka](#), [A. Clark](#) and [M. Lebby](#) "Structural and Thermal Properties of Single Crystalline Epitaxial Gd<sub>2</sub>O<sub>3</sub> and Er<sub>2</sub>O<sub>3</sub> Grown on Si(111)," ; 10.1149/2.005202jss *ECS J. Solid State Sci. Technol.* 2012 volume 1, issue 2, N24-N28
11. F. Erdem Arkun<sup>\*</sup>, Rytis Dargis, Robin Smith, David Williams, Andrew Clark, **Michael Lebby** "Integrated high reflectivity silicon substrates for GaN LEDs," physica status solidi (c) [Volume 9, Issue 3-4](#), pages 814–817, March 2012
12. [Rytis Dargis<sup>a</sup>](#), [Andrew Clark<sup>a</sup>](#), [Erdem Arkun<sup>a</sup>](#), [Radek Roucka<sup>a</sup>](#), [David Williams<sup>a</sup>](#), [Robin S. Smith<sup>a</sup>](#) and [Michael Lebby<sup>a</sup>](#), "Epitaxial Si and Gd<sub>2</sub>O<sub>3</sub> Heterostructures - Distributed Bragg Reflectors with Stress Management Function for GaN on Si Light Emitting Devices,"; doi: 10.1149/05004.0047ecst *ECS Trans.* 2013 volume 50, issue 4, 47-52
13. [Rytis Dargisa](#), [David Williamsa](#), [Robin Smitha](#), [Erdem Arkuna](#), [Scott Semansa](#), [Gary Vostersa](#), [Michael Lebbya](#) and [Andrew Clarka](#), "Study of the Structural and Thermal Properties of Single Crystalline Epitaxial Rare-Earth-Metal Oxide Layers Grown on Si(111)," ; doi: 10.1149/1.3633032 *ECS Trans.* 2011 volume 41, issue 3, 161-167
14. Williams, D.; Clark, A.; Arkun, E.; Jamora, A.; Vosters, G.; **Lebby, M.**, "Silicon light emitting device based on rare earth oxide superlattice," 2010 7th IEEE International Conference on Group IV Photonics, Beijing, Sept. 2010.
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16. **Lebby, M.S.**, "Green photonics technology and markets," Electronics Letters, vol. 45 , no. 20, pp.1007, Sept. 2009. DOI: [10.1049/el.2009.2563](https://doi.org/10.1049/el.2009.2563), Print ISSN 0013-5194, Online ISSN 1350-911X
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18. **Lebby, M.S.**, "Testimony before the US-China Economic and Security Review Commission on the optoelectronics industry", 24th March, 2009 (<http://www.oida.org/news/oida-news/2009/381>)
19. **Lebby, M.**; Clayton, R., "Growing at light speed [Optoelectronics]," Circuits Assembly, vol. 18, no. 9, pp. 44-5, Sept. 2007.
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#### **PERSONAL ACTIVITIES:**

1. CPMT Board of Governors (1998, 1999, 2000, 2001, 2002)
2. Co-Chair of a IEEE workshop on optoelectronic packaging technology (2000 and 2001)

3. IEEE Phoenix Section of Waves and Devices Junior Engineer (1993)
4. CPMT Junior Engineer (1995)
5. CPMT Distinguished Lecturer (2000)
6. TC-10 (Technical Committee on Optoelectronics) member (1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001)
7. TC-10 Leader (1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001)
8. CPMTs ECTC Technical Committee (1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004 – Present)
9. CPMTs ECTC Technical Committee Chair (1994, 1995, 1996)
10. CPMT's ECTC's Assistant Technical Program Chair (1999)
11. Session Chair ECTC 1992, 1993, 1994, 1995, 1996, 1997, 1999, 2000, 2002, 2005
12. Session Chair LEOS Post-deadline papers 1997
13. OSA Strategic planning committee 2006 and 2007
14. Organizer and editor for many of OIDA workshops in areas such as:
  - a. Perspectives in optoelectronics: Markets, research and manufacturing
  - b. Optical communications
  - c. Optical networking
  - d. Optical interconnects
  - e. Photonic integration
  - f. Green Photonics
  - g. High power lasers
  - h. LEDs and nitride based semiconductors
  - i. Optical sensors
  - j. Quantum dots
15. Founder and organizer for OIDA's OPTOmism™ green photonics conference, May 2009
  - a. Solar technical track planning
  - b. Solid state lighting track planning
  - c. Sensors and spectroscopy, optical communications track planning
16. 1991 – 1997 OIDA Steering Committee Member – Motorola
17. 1998 – 1999 OIDA Steering and Board Member – AMP/Tyco
18. 2000 OIDA Board Member – Intel

19. OSA 2006 - 2007 Strategic Planning Committee
20. OSA 2006 – Present Executive Forum committee
21. NEMI (National Engineering Manufacturing Institute) Optoelectronics Committee a number of times between 1997 to 2008
22. OIDA Board member 2005-2010
23. Presenter of the SPIE's Prism awards (touted the photonics Oscars by SPIE) for Green Photonics and Energy Efficiency in 2012
24. Judge of the SPIE's Prism awards in 2013
25. Technical advisory board consultant – Translucent Inc 2005-2010
26. Member (at various times) SPIE, APS, IEE, IEEE, OSA

#### **TECHNICAL ACTIVITIES & AWARDS:**

- Author of OIDA's **annual market optoelectronics report** and forecast (2009 version is over 600 pages), which receives international exposure and recognition. Regularly interacts with government agencies in Washington DC on photonics based projects (DARPA, NIH, NSF, DOE, NIST etc). Typical chapters included: LEDs, laser diodes, fiber optic communications, sensors, displays, green photonics, military photonics, and applications of photonics such as solid state lighting, automotive, medical etc.
- Has been recognized professionally as a **Fellow of IEEE (2005) and OSA (2007)** with his technical contributions to the field of optoelectronics.
- As an inventor he has achieved **over 385 issued/published patents** including 190 issued USPTO utility patents in the field of optoelectronics, 25 published patent applications, 94 European patents, 71 Japanese patents, 3 World patents, and 2 German patents. NB: A full list of the 385+ patents is available for viewing at the linkedin website (see above URL).
- His novel laser-based device, packaging, modules designs led Motorola to sell their patent portfolio independently where a number of the patents have "very high licensing coefficients". Dr. Lebbby was given a special award from the Chairman of Motorola for exemplary patent invention accomplishments in 1998 and **# 1 prolific inventor in Motorola's history**.
- Is the recipient of a **2nd doctorate** (higher) from Bradford University, UK, and only the second in the universities history to receive a D.Eng from industry (rest being academia).
- **Intreprenuer** at: i) Motorola: Co-founded Optobus division – VCSEL laser based parallel optical interconnect solution, and ii) Intel: Co-founded the Intel optics division for silicon photonics where over \$300M was initially invested for the division.

- **Entrepreneur:** Founded Ignis Optics Inc., a venture backed company (>\$30M) that designed and manufactured 10Gbps fiber optic transceivers. Sold the company to Bookham (Naq: BKHM) in 2003. Restructured OneChip Photonics through bankruptcy, and raised funding.
- IEEE CPMT **Board of Governors** ('98-'02); IEEE Phoenix Waves and Devices Junior Engineer of the Year (1993); CPMT Distinguished lecturer (2000), CPMT technical committee (TC-10 & ECTC) 1991 to present
- Advised at **Board of Director** level for a number of technical start-ups
- **Chartered Engineer** (C.Eng) from IEE (UK). The chartered engineering status is equivalent to the US PE (professional engineer).